ATTACHMENT B
Am ndments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) ~~A grating structure in an~~ An optical waveguide having a grating structure, the grating structure being composed of a material having a refractive index ~~variation and~~ variation, the grating structure comprising a first grating structure and a second grating structure of different ~~order gratings superimposed.~~ orders with respect to a certain wavelength superimposed, wherein:

the first grating structure is arranged to provide, in use, the coupling of optical energy in a direction substantially perpendicular to a core axis of the waveguide; and

the second grating structure is arranged to provide, in use, the coupling of optical energy in a direction substantially parallel to the core axis of the waveguide.

2. (Original) The grating structure as claimed in claim 1, wherein the grating structure comprises a first order grating and a second order grating superimposed.

3. (Previously Presented) The grating structure as claimed in claim 1, wherein at least one of the different order gratings is chirped.

4. (Previously Presented) The grating structure as claimed in claim 1, wherein at least one of the different order gratings is sampled.

5. (Currently Amended) The grating structure as claimed in claim 1, wherein at least one of the different order gratings is ~~apodised~~ apodized.

6. (Previously Presented) An optical filter in an optical waveguide, the filter comprising the grating structure as claimed in claim 1.

7. (Original) An filter as claimed in claim 6, wherein the filter comprises a chirped second order grating superimposed on a first order grating, the second order grating transmitting, in use, predetermined wavelengths of light energy substantially perpendicular to a core axis of the waveguide and at predetermined positions along the waveguide.

8. (Previously Presented) An optical free space coupler in an optical waveguide, the coupler comprising a first grating structure as claimed in claim 1.

9. (Original) A coupler as claimed in claim 8, wherein the first grating structure is formed within a first optical waveguide and is arranged to provide the emission of filtered light energy substantially perpendicular to a core axis of the first waveguide; and a second grating structure formed within a second optical waveguide placed in the path of emission of the filtered light energy can couple a filtered light energy substantially perpendicular to a core axis of the first waveguide; and a second grating structure formed within a second optical waveguide placed in the path of emission of the filtered

light energy can couple a portion of the filtered light energy along the second optical waveguide.

10. (Original) A coupler as claimed in claim 9, wherein at least one of the first or second grating structures comprises a first order grating and a second order grating superimposed.

11. (Original) An optical sensor in an optical waveguide, the sensor comprising the grating structure as claimed in claim 1.

12. (Original) A sensor as claimed in claim 11, wherein the grating structure comprises a second order grating superimposed on a first order grating formed within an optical waveguide, the grating structure having a predetermined second order modulation so as to provide for the reciprocal emission of optical energy substantially perpendicular to the optical waveguide; the sensor further comprising an optically sensitive material spaced adjacent to the optical waveguide, the material having optical reflective properties variable in accordance with an external physical parameter, the material reflecting the emitted optical energy from the grating structure back to the grating structure.

13. (Previously Presented) A device for suppressing ripples in a dispersion compensator in an optical fiber, the device comprising the grating structure as claimed

in claim 1 for providing an optical loss mechanism to effect the suppressing of the ripples.

14. (Previously Presented) A dispersion compensator for compensating dispersion in an optical fiber, the compensator comprising the grating structure as claimed in claim 1 for providing an optical loss mechanism for suppressing ripples.

15. (New) An optical filter comprising an optical waveguide having a grating structure, the grating structure being composed of a material having a refractive index variation, the grating structure comprising a chirped second order grating superimposed on a first order grating, the orders of the gratings being defined with respect to a certain wavelength, wherein:

the second order grating transmits, in use, predetermined wavelengths of light energy substantially perpendicular to a core axis of the waveguide and at predetermined positions along the waveguide; and

the first order grating is arranged to provide, in use, the coupling of optical energy in a direction substantially parallel to the core axis of the waveguide.

16. (New) A free space coupler comprising a first optical waveguide having a grating structure, the grating structure being composed of a material having a refractive index variation, the grating structure comprising a first grating structure and a second grating structure of different orders with respect to a certain wavelength superimposed, wherein:

the first grating structure is arranged to provide, in use, the emission of filtered light energy in a direction substantially perpendicular to a core axis of the waveguide; and

the second grating structure is arranged to provide, in use, the coupling of optical energy in a direction substantially parallel to the core axis of the waveguide,

the free space coupler further comprising a second optical waveguide placed in the path of emission of the filtered light energy to couple a portion of the filtered light energy along the second optical waveguide.

17. (New) An optical sensor comprising an optical waveguide having a grating structure, the grating structure being composed of a material having a refractive index variation, the grating structure comprising a second order grating superimposed on a first order grating and a second grating structure the orders of the gratings being defined with respect to a certain wavelength, wherein:

the second order grating has a predetermined second order modulation so as to provide, in use, for the reciprocal emission of optical energy substantially perpendicular to a core axis of the waveguide; and

the first order grating is arranged to provide, in use, the coupling of optical energy in a direction substantially parallel to the core axis of the waveguide,

the sensor further comprising an optically sensitive material spaced adjacent to the optical waveguide, the material having optical reflective properties variable in accordance with an external physical parameter, the material reflecting the emitted optical energy from the grating structure back to the grating structure.

18. (New) A dispersion compensator for compensating dispersion in an optical fibre, the compensator comprising an optical waveguide having a grating structure, the grating structure being composed of a material having a refractive index variation, the grating structure comprising a first grating structure and a second grating structure of different orders with respect to a certain wavelength superimposed, wherein:

the first grating structure is arranged to provide, in use, the coupling of optical energy in a direction substantially perpendicular to a core axis of the waveguide for providing an optical loss mechanism for suppressing ripples; and

the second grating structure is arranged to provide, in use, the coupling of optical energy in a direction substantially parallel to the core axis of the waveguide.

19. (New) A method for coupling optical energy substantially perpendicular to a core axis of an optical waveguide, comprising the steps of:

providing a grating structure in the optical waveguide, the grating structure being composed of a material having a refractive index variation and comprising a first grating structure and a second grating structure of different orders with respect to a certain wavelength superimposed;

coupling optical energy, via the first grating structure, in a direction substantially perpendicular to a core axis of the waveguide; and

coupling optical energy, via the second grating structure, in a direction substantially parallel to the core axis of the waveguide.

20. A method for providing dispersion compensation in an optical waveguide, comprising the steps of:

providing a grating structure in the optical waveguide, the grating structure being composed of a material having a refractive index variation and comprising a first grating structure and a second grating structure of different orders with respect to a certain wavelength superimposed;

providing an optical loss mechanism for suppressing ripples by coupling optical energy, via the first grating structure, in a direction substantially perpendicular to a core axis of the waveguide; and

coupling optical energy, via the second grating structure, in a direction substantially parallel to the core axis of the waveguide.